

SEQUENCE LISTING

<110> Sligar, Steven
Bayburt, Timothy

<120> Membrane Scaffold Proteins

<130> 87-00

<140> Not assigned

<141> 2001-11-20

<150> US 60/252,233

<151> 2000-11-20

<160> 46

<170> PatentIn Ver. 2.0

<210> 1

<211> 762

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> (1)..(762)

<223> Restriction sites, Nco I and Hind III, are at 5'
and 3' termini.

<400> 1

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ttgaaggctc cgccttggga aaacagctaa acctaaagct ccttgacaac tgggacagcg 180
tgacctccac cttcagcaag ctgcgcgaac agctcggccc tgtgaccag gagttctggg 240
ataacctgga aaaggagaca gagggcctga ggcaagagat gagcaaggat ctggaggagg 300
tgaaggccaa ggtgcagccc tacctggacg acttccagaa gaagtggcag gaggagatgg 360
agctctaccg ccagaagggtg gagccgctgc gcgcagagct ccaagagggc gcgcgccaga 420
agctgcacga gctgcaagag aagctgagcc cactgggcca ggagatgccc gaccgcgcgc 480
gcgcccattg ggacgcgctg cgcacgcctc tggcccccta cagcgacgag ctgcgccagc 540
gcttggccgc gcgccttgag gctctcaagg agaacggcgg cgccagactg gccgagtacc 600
acgccaaggc caccgagcat ctgagcacgc tcagcgagaa ggccaagccc gcgctcgagg 660
acctccgcca aggcctgctg cccgtgctgg agagcttcaa ggtcagcttc ctgagcgctc 720
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<210> 2

<211> 250

<212> PRT

<213> Homo sapiens

<400> 2

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Met Ala His Phe Trp Gln Gln Asp Glu Pro Pro Gln Ser Pro Trp Asp
1 5 10 15
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 20 25 30
 Gly Arg Asp Tyr Val Ser Gln Phe Glu Gly Ser Ala Leu Gly Lys Gln
 35 40 45
 Leu Asn Leu Lys Leu Leu Asp Asn Trp Asp Ser Val Thr Ser Thr Phe
 50 55 60
 Ser Lys Leu Arg Glu Gln Leu Gly Pro Val Thr Gln Glu Phe Trp Asp
 65 70 75 80
 Asn Leu Glu Lys Glu Thr Glu Gly Leu Arg Gln Glu Met Ser Lys Asp
 85 90 95
 Leu Glu Glu Val Lys Ala Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln
 100 105 110
 Lys Lys Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln Lys Val Glu Pro
 115 120 125
 Leu Arg Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys Leu His Glu Leu
 130 135 140
 Gln Glu Lys Leu Ser Pro Leu Gly Glu Glu Met Arg Asp Arg Ala Arg
 145 150 155 160
 Ala His Val Asp Ala Leu Arg Thr His Leu Ala Pro Tyr Ser Asp Glu
 165 170 175
 Leu Arg Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly
 180 185 190
 Gly Ala Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser
 195 200 205
 Thr Leu Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly
 210 215 220
 Leu Leu Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu
 225 230 235 240
 Glu Glu Tyr Thr Lys Lys Leu Asn Thr Gln
 245 250

<210> 3
 <211> 61
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide primer

<400> 3
tataccatgg gccatcatca tcatcatcat atagaaggaa gactaaagct ccttgacaac 60
t 61

<210> 4
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 4
gcaagcttat tactgggtgt tgagcttctt 30

<210> 5
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Nucleotide
sequence encoding Synthetic peptide.

<400> 5
tataccatgg gccatcatca tcatcatcat atagaaggaa gactaaagct ccttgacaac 60
tgggacagcg tgacctccac cttcagcaag ctgcgcgaaac agctcggccc tgtgacctcag 120
gagttctggg ataacctgga aaaggagaca gagggcctga ggcaggagat gagcaaggat 180
ctggaggagg tgaaggccaa ggtgcagccc tacctggacg acttccagaa gaagtggcag 240
gaggagatgg agctctaccg ccagaagggtg gagccgctgc gcgcagagct ccaagagggc 300
gcgcgccaga agctgcacga gctgcaagag aagttgagcc cactgggcca ggagatgcgc 360
gaccgcgcgc gcgcccattgt ggacgcgctg cgcacgcata tggcccccta cagcgactg 420
ctgcgccagc gcttgggccgc gcgccttgag gctctcaagg agaacggcgg cgccagactg 480
gccgagtacc acgccaaggc caccgagcat ctgagcacgc tcagcgagaa ggccaaaccc 540
gcgctcgagg acctccgcca aggctgctg cccgtgctgg agagcttcaa ggtcagcttc 600
ctgagcgctc tcgaggagta cactaagaag ctcaacaccc agtaataagc ttgc 654

<210> 6
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 6
Met Gly His His His His His Ile Glu Gly Arg Leu Lys Leu Leu
1 5 10 15
Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln
20 25 30

<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 8
taccatggca aagctccttg acaactggga cagcgtgacc tccaccttca gcaagctgcg 60
cgaacagctc ggccctgtga cccaggagtt ctgggataac ctggaaaagg agacagaggg 120
cctgaggcag gagatgagca aggatctgga ggaggtgaag gccaaaggtgc agccctacct 180
ggacgacttc cagaagaagt ggcaggagga gatggagctc taccgccaga aggtggagcc 240
gctgcgcgca gagctccaag agggcgcgcg ccagaagctg cacgagctgc aagagaagtt 300
gagcccactg ggcgaggaga tgcgcgaccg cgcgcgcgcc catgtggacg cgctgcgcac 360
gcatctggcc ccctacagcg acgagctgcg ccagcgcttg gccgcgcgcc ttgaggctct 420
caaggagaac ggcgggcgcca gactggccga gtaccacgcc aaggccaccg agcatctgag 480
cacgctcagc gagaaggcca aaccgcgct cgaggacctc cgccaaggcc tgctgcccgt 540
gctggagagc ttcaaggtca gcttcctgag cgctctcgag gactacacta agaagctcaa 600
caccagtaa taagcttgc 619

<210> 9
<211> 201
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 9
Met Ala Lys Leu Leu Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser
1 5 10 15
Lys Leu Arg Glu Gln Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn
20 25 30
Leu Glu Lys Glu Thr Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu
35 40 45
Glu Glu Val Lys Ala Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys
50 55 60
Lys Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu
65 70 75 80
Arg Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln
85 90 95
Glu Lys Leu Ser Pro Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala
100 105 110
His Val Asp Ala Leu Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu
115 120 125
Arg Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly
130 135 140
Ala Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr
145 150 155 160

Leu Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu
165 170 175

Leu Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu
180 185 190

Glu Tyr Thr Lys Lys Leu Asn Thr Gln
195 200

<210> 10
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 10
taccatggca aagctccttg acaactg 27

<210> 11
<211> 61
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 11
tataccatgg gccatcatca tcatcatcat atagaaggaa gactaaagct ccttgacaac 60
t 61

<210> 12
<211> 52
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 12
taagaagctc aacacccagg gtaccggtgg aggtagtgga ggtggtaccc ta 52

<210> 13
<211> 50
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 13
cagggtagcg gtggaggttag tggaggtggt accctaaagc tccttgacaa 50

<210> 14
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 14
gcaagcttat tactgggtgt tgagcttctt 30

<210> 15
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 15
Gly Thr Gly Gly Gly Ser Gly Gly Gly Thr
1 5 10

<210> 16
<211> 1260
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Nucleotide
sequence encoding a synthetic peptide.

<400> 16
tataccatgg gccatcatca tcatcatcat atagaaggaa gactaaagct ccttgacaac 60
tgggacagcg tgacctccac cttcagcaag ctgcgcgaa agctcggccc tgtgacctag 120
gagttctggg ataacctgga aaaggagaca gagggcctga ggcaggagat gagcaaggat 180
ctggaggagg tgaaggccaa ggtgcagccc tacctggacg acttcagaa gaagtggcag 240
gaggagatgg agctctaccg ccagaagggtg gagccgctgc gcgcagagct ccaagagggc 300
gcgcgccaga agctgcacga gctgcaagag aagctgagcc cactgggcga ggagatgcgc 360
gaccgcgcgc gcgccatgt ggacgcgctg cgcacgcac tggcccccta cagcgacgag 420
ctgcgccagc gcttggccgc gcgccttgag gctctcaagg agaacggcgg cgccagactg 480
gccgagtacc acgccaaggc caccgagcat ctgagcacgc tcagcgagaa ggccaagccc 540
gcgctcgagg acctccgcca aggcctgctg cccgtgctgg agagcttcaa ggtcagcttc 600
ctgagcgctc tcgaggagta cactaagaag ctcaacaccc agggtagcct aaagctcctt 660
gacaactggg acagcgtgac ctccaccttc agcaagctgc gcgaacagct cggccctgtg 720
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aagcccgcgc tcgaggacct ccgccaaggc ctgctgcccg tgctggagag cttcaaggtc 1200
agcttctcga gcgctctcga ggagtacact aagaagctca acaccagta ataagcttgc 1260

<210> 17

<211> 414

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 17

Met Gly His His His His His Ile Glu Gly Arg Leu Lys Leu Leu
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Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln
20 25 30

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr
35 40 45

Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu Glu Glu Val Lys Ala
50 55 60

Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu
65 70 75 80

Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu Arg Ala Glu Leu Gln
85 90 95

Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln Glu Lys Leu Ser Pro
100 105 110

Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala His Val Asp Ala Leu
115 120 125

Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu Arg Gln Arg Leu Ala
130 135 140

Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly Ala Arg Leu Ala Glu
145 150 155 160

Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr Leu Ser Glu Lys Ala
165 170 175

Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu Leu Pro Val Leu Glu
180 185 190

Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu Glu Tyr Thr Lys Lys
195 200 205

09990087.112001

Leu Asn Thr Gln Gly Thr Leu Lys Leu Leu Asp Asn Trp Asp Ser Val
 210 215 220
 Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln Leu Gly Pro Val Thr Gln
 225 230 235 240
 Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr Glu Gly Leu Arg Gln Glu
 245 250 255
 Met Ser Lys Asp Leu Glu Glu Val Lys Ala Lys Val Gln Pro Tyr Leu
 260 265 270
 Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln
 275 280 285
 Lys Val Glu Pro Leu Arg Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys
 290 295 300
 Leu His Glu Leu Gln Glu Lys Leu Ser Pro Leu Gly Glu Glu Met Arg
 305 310 315 320
 Asp Arg Ala Arg Ala His Val Asp Ala Leu Arg Thr His Leu Ala Pro
 325 330 335
 Tyr Ser Asp Glu Leu Arg Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu
 340 345 350
 Lys Glu Asn Gly Gly Ala Arg Leu Ala Glu Tyr His Ala Lys Ala Thr
 355 360 365
 Glu His Leu Ser Thr Leu Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp
 370 375 380
 Leu Arg Gln Gly Leu Leu Pro Val Leu Glu Ser Phe Lys Val Ser Phe
 385 390 395 400
 Leu Ser Ala Leu Glu Glu Tyr Thr Lys Lys Leu Asn Thr Gln
 405 410

<210> 18

<211> 1282

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 nucleotide sequence encoding an artificial
 protein.

<400> 18

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 gttctgggat aacctggaaa aggagacaga gggcctgagg caggagatga gcaaggatct 180
 ggaggaggtg aaggccaagg tgcagcccta cctggacgac ttccagaaga agtggcagga 240

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ggagatggag ctctaccgcc agaaggtgga gccgctgcgc gcagagctcc aagagggcgc 300
gcgcagagaag ctgcacgagc tgcaagagaa gctgagccca ctgggcgagg agatgcgcga 360
ccgcgcgcgc gcccatgtgg acgcgctgcg cacgcatctg gccccctaca gcgacgagct 420
gcgcacgcgc ttggccgcgc gccttgaggc tctcaaggag aacggcggcg ccagactggc 480
cgagtaccac gccaaaggcca ccgagcatct gagcacgctc agcgagaagg ccaagcccgc 540
gctcgaggac ctccgccaaag gcctgctgcc cgtgctggag agcttcaagg tcagcttcct 600
gagcgctctc gaggagtaca ctaagaagct caacaccag ggtaccggtg gaggtagtgg 660
aggtggtacc ctaaagctcc ttgacaactg ggacagcgtg acctccacct tcagcaagct 720
gcgcgaacag ctcgccctg tgaccagga gttctgggat aacctgaaa aggagacaga 780
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gccgctgcgc gcagagctcc aagagggcgc gcgcagaaag ctgcacgagc tgcaagagaa 960
gctgagccca ctgggcgagg agatgcgcga ccgcgcgcgc gcccatgtgg acgcgctgcg 1020
cacgcatctg gccccctaca gcgacgagct gcgcagcgc ttggccgcgc gccttgaggc 1080
tctcaaggag aacggcggcg ccagactggc cgagtaccac gccaaaggcca ccgagcatct 1140
gagcacgctc agcgagaagg ccaagcccgc gctcgaggac ctccgccaag gcctgctgcc 1200
cgtgctggag agcttcaagg tcagcttcct gagcgctctc gaggagtaca ctaagaagct 1260
caacaccag taataagctt gc 1282

```

<210> 19

<211> 422

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 19

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Met Gly His His His His His Ile Glu Gly Arg Leu Lys Leu Leu
  1              5              10              15

```

```

Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln
      20              25              30

```

```

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr
      35              40              45

```

```

Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu Glu Glu Val Lys Ala
      50              55              60

```

```

Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu
      65              70              75              80

```

```

Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu Arg Ala Glu Leu Gln
      85              90              95

```

```

Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln Glu Lys Leu Ser Pro
      100             105             110

```

```

Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala His Val Asp Ala Leu
      115             120             125

```

```

Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu Arg Gln Arg Leu Ala
      130             135             140

```

09990087 112004

Ala	Arg	Leu	Glu	Ala	Leu	Lys	Glu	Asn	Gly	Gly	Ala	Arg	Leu	Ala	Glu	145	150	155	160
Tyr	His	Ala	Lys	Ala	Thr	Glu	His	Leu	Ser	Thr	Leu	Ser	Glu	Lys	Ala	165	170	175	
Lys	Pro	Ala	Leu	Glu	Asp	Leu	Arg	Gln	Gly	Leu	Leu	Pro	Val	Leu	Glu	180	185	190	
Ser	Phe	Lys	Val	Ser	Phe	Leu	Ser	Ala	Leu	Glu	Glu	Tyr	Thr	Lys	Lys	195	200	205	
Leu	Asn	Thr	Gln	Gly	Thr	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Thr	Leu	Lys	210	215	220	
Leu	Leu	Asp	Asn	Trp	Asp	Ser	Val	Thr	Ser	Thr	Phe	Ser	Lys	Leu	Arg	225	230	235	240
Glu	Gln	Leu	Gly	Pro	Val	Thr	Gln	Glu	Phe	Trp	Asp	Asn	Leu	Glu	Lys	245	250	255	
Glu	Thr	Glu	Gly	Leu	Arg	Gln	Glu	Met	Ser	Lys	Asp	Leu	Glu	Glu	Val	260	265	270	
Lys	Ala	Lys	Val	Gln	Pro	Tyr	Leu	Asp	Asp	Phe	Gln	Lys	Lys	Trp	Gln	275	280	285	
Glu	Glu	Met	Glu	Leu	Tyr	Arg	Gln	Lys	Val	Glu	Pro	Leu	Arg	Ala	Glu	290	295	300	
Leu	Gln	Glu	Gly	Ala	Arg	Gln	Lys	Leu	His	Glu	Leu	Gln	Glu	Lys	Leu	305	310	315	320
Ser	Pro	Leu	Gly	Glu	Glu	Met	Arg	Asp	Arg	Ala	Arg	Ala	His	Val	Asp	325	330	335	
Ala	Leu	Arg	Thr	His	Leu	Ala	Pro	Tyr	Ser	Asp	Glu	Leu	Arg	Gln	Arg	340	345	350	
Leu	Ala	Ala	Arg	Leu	Glu	Ala	Leu	Lys	Glu	Asn	Gly	Gly	Ala	Arg	Leu	355	360	365	
Ala	Glu	Tyr	His	Ala	Lys	Ala	Thr	Glu	His	Leu	Ser	Thr	Leu	Ser	Glu	370	375	380	
Lys	Ala	Lys	Pro	Ala	Leu	Glu	Asp	Leu	Arg	Gln	Gly	Leu	Leu	Pro	Val	385	390	395	400
Leu	Glu	Ser	Phe	Lys	Val	Ser	Phe	Leu	Ser	Ala	Leu	Glu	Glu	Tyr	Thr	405	410	415	
Lys	Lys	Leu	Asn	Thr	Gln											420			

<210> 20
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 20
tggagctcta ccgccagaag gtggagccct acagcgacga gct 43

<210> 21
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 21
gcaagcttat tactgggtgt tgagcttctt 30

<210> 22
<211> 522
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
nucleotide sequence encoding an artificial
peptide.

<400> 22
tataccatgg gccatcatca tcatcatcat atagaaggaa gactaaagct ccttgacaac 60
tgggacagcg tgacctccac cttcagcaag ctgcggaac agctcggccc tgtgacctag 120
gagttctggg ataacctgga aaaggagaca gagggcctga ggcaggagat gagcaaggat 180
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gaggagatgg agctctaccg ccagaagggtg gagccctaca gcgacgagct gcgccagcgc 300
ttggccgcgc gccttgaggc tctcaaggag aacggcgggc ccagactggc cgagtaccac 360
gccaaggcca ccgagcatct gagcacgctc agcgagaagg ccaaaccgcg gctcgaggac 420
ctccgccaaag gcctgctgcc cgtgctggag agcttcaagg tcagcttcct gagcgctctc 480
gaggagtaca ctaagaagct caacacccag taataagctt gc 522

<210> 23
<211> 168
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 23

Met Gly His His His His His His Ile Glu Gly Arg Leu Lys Leu Leu
1 5 10 15

Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln
20 25 30

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr
35 40 45

Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu Glu Glu Val Lys Ala
50 55 60

Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu
65 70 75 80

Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Tyr Ser Asp Glu Leu Arg
85 90 95

Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly Ala
100 105 110

Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr Leu
115 120 125

Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu Leu
130 135 140

Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu Glu
145 150 155 160

Tyr Thr Lys Lys Leu Asn Thr Gln
165

<210> 24
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 24
cagaattcgc tagccgagta ccacgcca

29

<210> 25
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 25
gcaagcttat tactgggtgt tgagcttctt 30

<210> 26
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 26
ataccatggg ccatcatcat catcatcata 30

<210> 27
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer

<400> 27
cagaattcgc tagcctggcg ctcaacttct ctt 33

<210> 28
<211> 522
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
nucleotide sequence encoding an artificial
peptide.

<400> 28
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gagttctggg ataacctgga aaaggagaca gagggcctga ggcaggagat gagcaaggat 180
ctggaggagg tgaaggccaa ggtgcagccc tacctggacg acttccagaa gaagtggcag 240
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gccaaggcca ccgagcatct gagcacgctc agcgagaagg ccaaaccgc gctcgaggac 420
ctccgccaag gcctgctgcc cgtgctggag agcttcaagg tcagcttctc gagegctctc 480
gaggagtaca ctaagaagct caacaccag taataagctt gc 522

<210> 29
<211> 168
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

peptide

<400> 29

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Met Gly His His His His His His Ile Glu Gly Arg Leu Lys Leu Leu
 1              5              10              15

Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln
      20              25              30

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr
      35              40              45

Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu Glu Glu Val Lys Ala
      50              55              60

Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu
      65              70              75              80

Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu Arg Ala Glu Leu Gln
      85              90              95

Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln Glu Lys Leu Ser Ala
      100             105             110

Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr Leu
      115             120             125

Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu Leu
      130             135             140

Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu Glu
      145             150             155             160

Tyr Thr Lys Lys Leu Asn Thr Gln
      165

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<210> 30

<211> 77

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide

<400> 30

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taccatgggt catcatcatc atcatcacat tgagggacgt ctgaagctgt tggacaattg 60
ggactctgtt acgtcta

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<210> 31

<211> 62

<212> DNA

<213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide

<400> 31
 aggaattctg ggacaacctg gaaaaagaaa ccgagggact gcgtcaggaa atgtccaaag 60
 at 62

<210> 32
 <211> 54
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide

<400> 32
 tatctagatg actttcagaa aaaatggcag gaagagatgg aattatatcg tcaa 54

<210> 33
 <211> 73
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide

<400> 33
 atgagctcca agagaagctc agcccattag gcgaagaaat gcgcatcgcc gcccggtgcac 60
 atgttgatgc act 73

<210> 34
 <211> 65
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide

<400> 34
 gtctcgaggc gctgaaagaa aacgggggtg cccgcttggc tgagtaccac gcgaaagcga 60
 cagaa 65

<210> 35
 <211> 56
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide

<400> 35
 gaagatctac gccagggctt attgctgtt cttgagagct ttaaagtcag ttttct 56

<210> 36
 <211> 61
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide

<400> 36
 cagaattcct gcgtcacggg gccagttgt tcgcgaagtt tactgaaggt agacgtaaca 60
 g 61

<210> 37
 <211> 55
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide

<400> 37
 tcactagat atggctgaac cttggccttc acctcttcta aatctttgga cattt 55

<210> 38
 <211> 80
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide

<400> 38
 tggagctcat ggagtttttg gcgtgcccc tcttgagtt ccgcacgcag cggttccacc 60
 ttttgacgat ataattccat 80

<210> 39
 <211> 76
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide

<400> 39
 gcctcgagac gtgcggccaa acgctggcga agttcatccg aatacggcgc caaatgagtc 60
 cggagtgcac caacat 76

<210> 40

<211> 61
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
nucleotide

<400> 40
gtagatcttc cagcgccggt ttcgcttttt cgctcaaggt gtcaggtgt tctgtcgctt 60
t 61

<210> 41
<211> 66
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
nucleotide

<400> 41
ccaagcttat tactgggtat tcagcttttt agtatattct tccagagctg acagaaaact 60
gacttt 66

<210> 42
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
nucleotide

<400> 42
accatgggtc atcatcatca tcatcacatt gagggacgtc tgaagctgtt ggacaattgg 60
gactctgtta cgtctacctt cagtaaaactt cgcgacaac tgggccccgt gacgcaggaa 120
ttctgggaca acctggaaaa agaaaccgag ggactgcgtc aggaaatgtc caaagattta 180
gaagaggtga aggccaaggt tcagccatat ctagatgact ttcagaaaaa atggcaggaa 240
gagatggaat tatatcgtca aaaggtggaa ccgctgcgtg cggaactgca agagggggca 300
cgccaaaaac tccatgagct ccaagagaag ctacgcccac taggcgaaga aatgcgcgat 360
cgcgccccgtg cacatgttga tgcactccgg actcatttgg cgccgtattc ggatgaactt 420
cgccagcgtt tggccgcacg tctcgaggcg ctgaaagaaa acgggggtgc ccgcttggct 480
gagtaccacg cgaaagcgac agaacacctg agcaccttga gcgaaaaagc gaaaccggcg 540
ctggaagatc tacgccaggg cttattgcct gttcttgaga gctttaaagt cagttttctg 600
tcagctctgg aagaatatac taaaaagctg aataccagc aataagcttg g 651

<210> 43
<211> 201
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 43

Met Gly His His His His His His Ile Glu Gly Arg Leu Lys Leu Leu
1 5 10 15

Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln
20 25 30

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr
35 40 45

Glu Gly Leu Arg Gln Glu Met Ser Pro Tyr Leu Asp Asp Phe Gln Lys
50 55 60

Lys Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu
65 70 75 80

Arg Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln
85 90 95

Glu Lys Leu Ser Pro Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala
100 105 110

His Val Asp Ala Leu Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu
115 120 125

Arg Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly
130 135 140

Ala Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr
145 150 155 160

Leu Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu
165 170 175

Leu Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu
180 185 190

Glu Tyr Thr Lys Lys Leu Asn Thr Gln
195 200

<210> 44

<211> 201

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
peptide

<400> 44

Met Gly His His His His His His Ile Glu Gly Arg Leu Lys Leu Leu
1 5 10 15

Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln
20 25 30

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr
 35 40 45
 Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu Glu Val Lys Ala
 50 55 60
 Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu
 65 70 75 80
 Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu Arg Ala Glu Leu Gln
 85 90 95
 Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln Glu Lys Leu Ser Pro
 100 105 110
 Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala His Val Asp Ala Leu
 115 120 125
 Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu Arg Gln Arg Leu Ala
 130 135 140
 Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly Ala Arg Leu Ala Glu
 145 150 155 160
 Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr Leu Ser Glu Lys Ala
 165 170 175
 Lys Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu
 180 185 190
 Glu Tyr Thr Lys Lys Leu Asn Thr Gln
 195 200

<210> 45
 <211> 392
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 peptide

<400> 45
 Met Gly His His His His His His Ile Glu Gly Arg Leu Lys Leu Leu
 1 5 10 15
 Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln
 20 25 30
 Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr
 35 40 45
 Glu Gly Leu Arg Gln Glu Met Ser Pro Tyr Leu Asp Asp Phe Gln Lys
 50 55 60

09990087 "1.12001

Lys	Trp	Gln	Glu	Glu	Met	Glu	Leu	Tyr	Arg	Gln	Lys	Val	Glu	Pro	Leu	65	70	75	80
Arg	Ala	Glu	Leu	Gln	Glu	Gly	Ala	Arg	Gln	Lys	Leu	His	Glu	Leu	Gln	85	90	95	
Glu	Lys	Leu	Ser	Pro	Leu	Gly	Glu	Glu	Met	Arg	Asp	Arg	Ala	Arg	Ala	100	105	110	
His	Val	Asp	Ala	Leu	Arg	Thr	His	Leu	Ala	Pro	Tyr	Ser	Asp	Glu	Leu	115	120	125	
Arg	Gln	Arg	Leu	Ala	Ala	Arg	Leu	Glu	Ala	Leu	Lys	Glu	Asn	Gly	Gly	130	135	140	
Ala	Arg	Leu	Ala	Glu	Tyr	His	Ala	Lys	Ala	Thr	Glu	His	Leu	Ser	Thr	145	150	155	160
Leu	Ser	Glu	Lys	Ala	Lys	Pro	Ala	Leu	Glu	Asp	Leu	Arg	Gln	Gly	Leu	165	170	175	
Leu	Pro	Val	Leu	Glu	Ser	Phe	Lys	Val	Ser	Phe	Leu	Ser	Ala	Leu	Glu	180	185	190	
Glu	Tyr	Thr	Lys	Lys	Leu	Asn	Thr	Gln	Gly	Thr	Leu	Lys	Leu	Leu	Asp	195	200	205	
Asn	Trp	Asp	Ser	Val	Thr	Ser	Thr	Phe	Ser	Lys	Leu	Arg	Glu	Gln	Leu	210	215	220	
Gly	Pro	Val	Thr	Gln	Glu	Phe	Trp	Asp	Asn	Leu	Glu	Lys	Glu	Thr	Glu	225	230	235	240
Gly	Leu	Arg	Gln	Glu	Met	Ser	Pro	Tyr	Leu	Asp	Asp	Phe	Gln	Lys	Lys	245	250	255	
Trp	Gln	Glu	Glu	Met	Glu	Leu	Tyr	Arg	Gln	Lys	Val	Glu	Pro	Leu	Arg	260	265	270	
Ala	Glu	Leu	Gln	Glu	Gly	Ala	Arg	Gln	Lys	Leu	His	Glu	Leu	Gln	Glu	275	280	285	
Lys	Leu	Ser	Pro	Leu	Gly	Glu	Glu	Met	Arg	Asp	Arg	Ala	Arg	Ala	His	290	295	300	
Val	Asp	Ala	Leu	Arg	Thr	His	Leu	Ala	Pro	Tyr	Ser	Asp	Glu	Leu	Arg	305	310	315	320
Gln	Arg	Leu	Ala	Ala	Arg	Leu	Glu	Ala	Leu	Lys	Glu	Asn	Gly	Gly	Ala	325	330	335	
Arg	Leu	Ala	Glu	Tyr	His	Ala	Lys	Ala	Thr	Glu	His	Leu	Ser	Thr	Leu	340	345	350	

Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu Leu
355 360 365

Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu Glu
370 375 380

Tyr Thr Lys Lys Leu Asn Thr Gln
385 390

<210> 46

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
peptide

<220>

<221> VARIANT

<222> (4)

<223> X at position 4 is serine or threonine.

<400> 46

Gly Gly Gly Xaa
1

0990037-112001